Pro-

9 . Ui œ σ 4 2 10 30.3 3,2 39,6 2.4 0.6 9 5.8 2.2 20 FROM # Ba 0 LOCATION Sec. 26, DATE BEGUN_ DRILL HOLE CASING. 40.1 30.3 22.220 9 3.2 2.4 0.6 6 5.8 34:44 70 6 6.4 0.5 0.8 1.8 0.3 4.3 0.2 22-23 3.6 2.2 THICK-20 Tosco-Federal 23.7 Sandstone, Siltstone, like Siltstone, Sandstone, grayish orange v f grained siltstone, clayey, contains thin zones of Alternating beds dark mineral flaky aggregate mineral flakes Siltstone, Core dark mineral matter and thin zones of claystone and oil shale of Siltstone, light olive gray, Sandstone, biotite flakes and a few thin irr No sample. <u>|-</u>] dark mineral flakes near top DATE COMPLETED. loss 3 8., like like light olive gray, calcareous, sandy, obscurely bedded, contains dark ₽. light olive gray, v f grained, no core 96 σ of sandstone, siltstone, W., Rio Blanco County, Colorado ELEVATION. _ DRILLER, REMARKS: slightly calcareous, tuffaceous, contains flakes of LITHOLOGIC DESCRIPTION laminated zones of silty clay and Longyear HO core 2-1/2" dia and silty, calcareous, contains scattered /shale Fig LOGGED BY G. a thin zone M. Pipiringos PAGE___1 TOTAL DEPTH l Of gp. barren barren barren barren barren barren barren barren Gr. Est. lean Lean lean lean lean lean lean GPT

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CORE LOG

	 		18	17			16			15	· · ·	14	···	,	<u></u> ω΄,	 12		· 		11		-
		Therag M.	78.9	9.4			7.5			5.5		53.7		1	7.1	6.9			•	40.I	FROM	DRI DA: CA:
		8	85.	78.9			9.4			. 7.5	,	5.		2.1 3 3.13 3.13	53.7	.7.1				46.9	ТО	DRILL HOLE. LOCATION DATE BEGUN CASING
		101	6.1	19.5			1.9	 		2.5		1.3	-	459 (2)	6.6	0.2	,			6.8	THICK- NESS	
	, silty zones and inclusions of lean grade	pink chalky grains and dark mineral flakes and biotite, barren; with brownish	Sandstone, It olive gray, v f grained, slightly calcareous, tuffaceous, contains	Siltstone, like 15; a 1/2" marcasite nodulé occurs at 70.75 ft	i	contains hexagonal biotite and other dark mineral flakes	Sandstone, light olive gray, v f to fine grained, calcareous, tuffaceous,	biotite and other dark mineral flakes	lighter bands are silty, V f grained sandstone, irregularly bedded, contains	Siltstone, light olive gray to pale brown, calcareous, darker bands are clayey,		Core loss		prominent at 49.2 - 52.3. Small cavities in leached zone at 49.5 - 49.6	Sandstone like 11, darker olive gray, clayey siltstone bands especially	Core loss		olive gray siltstone and claystone in middle third	chalky grains, some biotite, zones of dk flaky minerals, and thin zones of	Sandstone, It olive gray v f grained, calcareous tuffaceous, contains pink		TOSCO-Federal 3 PAGE 2 PAGE 2 PAGE 1 PAGE 2 PAGE 1 PAGE 2 PAGE BY 1 PAGE 2 PA
GPO 846 - 153			barren - lean	barren - lean			barren			barren - lean					barren					barren		0F

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	פס	DRILL HOLE	Tos	Tosco-Federal 3	0
	LO	LOCATION		ELEVATION	
	DA	DATE BEGUN		DATE COMPLETED DRILLER	
	CA	CASING		REMARKS:	
	FROM	10	THICK- NESS	LITHOLOGIC DESCRIPTION	
w.	85	101.5	16.5	Siltstone, pale yellowish brown, wavy bedded, contains irregular thin zone of	barren - lean
				sandstone, pink grains, biotite, black organic flakes and white analcite?	
	·			aggregate; core loss at 85.45- 85.6, 85.7-86.1 and 100.9 - 101.5; leached zones	
				at 86.1, 87.4 and 88.5; fragment of small leaf and peticle at 85.65	
Ο.	101.5	15.	13.5	Same as 19, but sandstone slightly more abundant than siltstone; coalified plant	
	100.000	S1 - 24		ment at	
•) -	no sample	
	,				
ļ	15.	17.9	2.9	Siltstone, light olive gray v f grained, calcareous, contains biotite and dark	barren - lean
		-		organic flakes, contains a few thin tuffaceous sandstone beds, and a porous	
	•			micro-vuggy zone in basal 0.5 ft	•
N	17.9	25.3	7.4	Sandstone and clayey siltstone in about equal parts; like beds 19 and 20;	barren - lean
				contains 1/2" zones of marcasite at 118.6 and 121.8, thin porous micro-vuggy	
				zones at 118.85 and 119.4	
Ç.	25.3	1 34.	8.7	Siltstone, olive gray with lesser amounts of light olive gray sandstone, like bed	19, lean
				thin marcasite nodule at 129.35	
+~	134	135		Sandstone, light olive gray v f grained, calcareous, contains biotite flakes,	barren - lean
				small thin stringers of organic matter, disseminated small marcasite aggregates,	
				which contain minute calcite crystals and white	
				grains of analcite; unit probably tuffaceous	

GFO 846 - 153

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29 82.2 87.5 30 87.5 207.5 31 207.5 209.	82.2 87.1 87.5 207.5 87.5 209	82.2 87. 87.5 207. 87.5 207.	82.2 87. 87.5 207.	82.2 87. 87.5 207.	82.2 87. 87.5 207.	82.2 87.	82.2 87.	82.2 87.	82.2 87.					T # 200 00 000 000 000 000 000 000 000 00	28 5903 82.2	*	27 53.6 59.3	26 53 53.6	-	13224 Wass 142-	25 135 153	FROM TO	CASING	DATE BEG	DRILL HOLE	
5 20.0 	20.	20.	20.	20.	20.					5 5.3				172-173	2 22.9		3 5.7	5 0.6		U3	8	THICK- NESS			im	
Stitstone as in 30	litstone as in	litstone as in			marcasite and coaly matter common	Oil shale and siltstone, interdominated, olive gray, calcareous stringers of		marcasite nodule at 183.9 and 185.3, disseminated marcasite common 185-187.5	with zone of organic-bearing siltstone, dark flakes of organic matter throughout	Sandstone, light olive gray, v f to f grained, calcareous, micro-vuggy, biotitic		176.8, 177.5 and 178.9	on throughout vuggy zone at 167.2, marcasite nodules	more evenly banded in top 2.5 ft, irregular stringers of black organic matter	Siltstone, light olive to olive gray, calcareous, irregularly banded, two zones		Siltstone with sandstone bands, like 25	Sandstone like 24, contains marcasite nodule at top; minor thin zones of siltstone	٠	at 149.8	Siltstone with lesser thin zones of sandstone; like 23 thin marcasite nodules	LITHOLOGIC DESCRIPTION	REMARKS:	DATE COMPLETED DELLED ELEVATION TOTAL DEPTH.		
			lean			± 15-20 glt				, barren - lean	·				lean		lean	ne barren - lean			lean			1	OF	

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	Possible contact of Evacuation Creek with Farachute Creek Member				,
		1-242	W. ~ 24		
lean	Siltstone, brownish gray with minor darker laminae and bands	1.8	242.5	240.8	9
	thick zone of disturbed bedding in oil shale at 239.7 - 240.5				
lean	Siltstone, brownish gray and oil shale dark yellowish brown in beds 0.1-0.8 ft	2.6	40.8	38.2	õ.
lean	Oil shale, olive gray w/minor thin bands of siltstone	2.2	38.2	36	17
	236				
· lean	Zebra striped silty oil shale and sandy siltstone, marcasite at 234.4-234.5 and	3.7	36	32.3	9
	organic matter				
lean	Siltstone, brownish gray and sandy siltstone, yellowish gray w/dark flakes of	0.8	32.3	31.5	5
	organic matter			•	-
lean	Siltstone, brownish gray, slightly calcareous, massive, contains flakes of	8.4	31.5	23.1	4
· fair	Oil shale and siltstone, as in 30; thickest band of oil shale is at 218.9-219		23.1	210.2	$\tilde{\omega}$
	•				
	and lenses of marcasite				
fair	Oil shale, grayish brown, slightly calcareous, silty, massive, contains nodules	0.8	210.2	209.4	$\ddot{\sim}$
	LITHOLOGIC DESCRIPTION	THICK- NESS	0.1	FROM	
45	,REMARKS:		CASING	, CA	
		!	DATE BEGUN	DA	
<u> </u>	ELEVATIONTOTAL DEPTH		LOCATION	Lo	
OF	Tosco-Federal 3	Tosc	DRILL HOLE	DR	
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	colors of the creation of the		· ',		
barren	Siltstone, light olive gray with medium gray fine grained bands, slightly	0.6	293.5	292.9	45
	and dark blackish-brown tarry substance similar to the interstitial material				
	gregat		·		.
	is fine grained, analcitic, tuffaceous and contains interstitial dark grain				
	at 289.8 - 290 and 292.3-292.5. The siltstone is banded as in 41; the sandstone				
barren	Siltstone and tuffaceous sandstone in beds 1/4 inch to 0.6 ft thick, vuggy zones	5.6	92.9	87.3	44
				,	
	surfaces at 275, 277.7, 278.1, 281.8				
	ch thick; vug				,
	marcasite aggregates, and clear tabular gypsum crystals, some sandy layers less	4			
barren	Siltstone, like 41; fracture surface at 279-279.1, dips about 65°, coated with	14	87.3	73.	43
,	Core loss	0.3	73.	72.7	
		•			
	Siltstone, like 41	8.7	72.7	64.	42
				•	
lean -	Core loss	0.5	64.	63.5	
				ď	
	strap-like leaf fragments common				
lean -	Siltstone, yellowish gray thin bands and laminae of darker siltstone, coalified	1.7	63.5	61.8	41
± 18-12-	Oil shale, brownish gray to pale brown, thinly varved, calcite		261.8	242.5	40
	LITHOLOGIC DESCRIPTION	THICK- NESS	Т0	FROM	
	REMARKS:		CASING	و	
	DATE COMPLETED DRILLER LOGGED BY	Ī	DATE BEGUN.	D,A	
H	ELEVATIONTOTAL DEPTH		LOCATION		
니 아루 	Tosco-Federal 3 PAGE 6	Tos	DRILL HOLE_	D	
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GPO 846-153

Drill hole

50 311.8		49 09.		48 305.	H2775	47 95.3	FROM 46 293.5	0.5.5.
	312.6	11.75		09.	8 3 5 12 12 12	3 305.	T0 295.3	DRILL HOLE LOCATION LOCATION CASING CASING
	0.8	2.75		4	. (); e . (0)	9.7	THICK- NESS	
	Siltstone, pale yellowish brown, calcite, massive with yellow gray nodules and lenticles scattered throughout	Siltstone, pale brown to brownish gray, slightly calcareous; contains zones of lean oil shale in zone 310.2- 310.6, a nodule of tuffaceous siltstone at 310; minute aggregate of marcasite in zone 309.3- 310.7	f tuffaceous sandstone; chalky white analcite(?) grains more conspicuous i	matter throughout Siltstone, pale brown, like 47 but generally finer grained, contains fewer zones	tuffaceous sandstone zones at 297.4 - 297.65, 298.5-298.7, 299.75- 299.85, and 303.7- 304.3; marcasite nodules at 297.6 and 302.9- 303; bedding plane at 303.2 studded with clear and chalky gypsum(?) xtals, flakes, blackish brown	294-294.2, blackish brown substance as in 44; coating fracture surface at 295; same substance probably scattered as flakes throughout interval Siltstone, pale brown with 1/4" thick oil shale beds at 295.4 and 296.25;	s sandstone; marcasite nodule	Tosco-Federal 3 PAGE 7 PAGE 7 DATE COMPLETED DRILLER ELEVATION TOTAL DEPTH REMARKS:
	barren - lean	barren - lean		barren - lean		lean	barren - lear	# OF

CORE LOG

U. S. GEOLOGICAL SURVEY

	siltstone with dark organic mineral flakes at 331.7- 331.85				
± 24 g/t	Oil shale like 52; contains thin calcite and analcite zones at 329.1 and 330.02;	6.3	333.65	327.35	œ
barren - lea	Siltstone, like 47	0.7	27.35	26.65	7
	l H				
	Marcasite nodule at 326.2, minute flattened spheroidal aggregates of marcasite				
lean - fair	Oil shale as in 52; siltstone zones at 326.35 - 326.38 and 326.53 - 326.6,	1.3	26.65	25.35	9
				. ,	
	324.33 - 324.4 and 324.65 - 324.87				
lean	Siltstone and oil shale as in 53 and 54. Oil shale zone at 324.18-324.21,	1.75	25.35	23.6	G.
			,		
fair	Oil shale like 52	0.35	23.6	23.25	+
lean	Siltstone, pale brown, like 47; contains oil shale zone 322.96- 323.02	0.5	23.25	22.75	w
				-	
	320.45- 320.48 and 322.57- 322.62				
	casite nodules at 321.35 and 322.46; t				
fair (15-18GT	Oil shale, pale yellowish brown, varved, slightly calcitic, contains thin	2.45	22.75	20.3	2
-	•				
	314.7, 315.5- 315.6, 316.05 - 316.45, 317 - 317.1				
barren - le	Siltstone and oil shale like 49. Oil shale zones at 313.4-313.5, 314.25 -	₹7.7	320.3	312.6	7
	LITHOLOGIC DESCRIPTION	THICK- NESS	то	FROM	
	REMARKS:		CASING	CA	
	DATE COMPLETED DRILLERLOGGED BY		DATE BEGUN	D A	
¥ 1	FAGE ELEVATION TOTAL D	10	DRILL HOLE_	רס סא	٠.
О П	Toro-Tederal 3	T T	: : :	ļ .	

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U. S. GEOLOGICAL SURVEY

63 355.6 361	355.6	355.6	355.6	3			62 55. 5		61 48.			*		60 41.65			59 333.65 341	FROM	DRILL HOLE LOCATION DATE BEGUN CASING
				1.05 5.45	-		5.6 0.6		55. 7					48. 6.35		1000 000	1.65 8	TO THICK-	E m
	and aggregates	te aggregate and clear gypsum xtals; surface from 359.4 - 360.4	flakes, and chalky gypsum or analcite grains, all fracture surfaces studded by	Siltstone, pale brown, slightly calcitic, contains abundant dark organic mineral		marcasite aggregates and clear tabular gypsum xtals	Oil shale, dark yellowish brown, varved, fracture surface at 355-355.2 lined w/	marcasite aggregates occur on most fracture surfaces	Siltstone like 47; contains one thin oil shale zone at 350 and one at 351.8;	spheroidal aggregates of marcasite	345.6-345.9 and 347.3 - 348; many fracture surfaces studded with flattened	ickest beds of oil shale occur at 341.6- 342.	344.15-344.3; thin irregularly bedded anarcitic sandstone stringers	Siltstone and oil shale in beds 1/4" to 1 ft thick, marcasite nodules at	340.1 and at 340.3-340.4	and 338.65-338.75; marcasite nodules at 338.35; and marcasite xtals on fracture	Siltstone, like 47; contains thin zones of oil shale 334.5- 334.7, 338.2-338.4	LITHOLOGIC DESCRIPTION	Tosco- Federal 3 PAGE 9 OATE COMPLETED DRILLER ELEVATION TOTAL DEPTH. REMARKS:
				barren - lea	19800 (Assessed in the control of th		9 g/t	•	lean - barrer					barren - lea			barren - lea		# CF

CORE LOG

U. S. GEOLOGICAL SURVEY

 22	70	69	68	. 67	65	64	
401.02		89.2	80.8	64.7 Ferryms	62.46 63.	FROM 361:05	DRI LOY DA: CA:
401.57		92.57	89.2	80.8	63.	то 362.46	DRILL HOLE, LOCATION DATE BEGUN CASING
0.55	8.45	3.37	8.4	16.1	0.54	THICK- NESS 1.41	TG
Analcite and some calcite, silty, with very thin oil shale laminae	contains a layer of oil shale at 393.03-393.4 and a thin band 398.6; in 399-400.4 oil shale beds are minor and too thin to	Oil shale like 62) contains zones of siltstone at 389.75-389.9, 391.95-392.2 and 392.25-392.35	Siltstone, like 61) no oil shale layer; only 1 fracture surface water with marcasite xtals at 387.7-387.9	Siltstone, like 61) contains thin oil shale zones at 370.5, 370.7, 373.8, 374.5, 375.1, 377.5-378.3, and at 379.15-379.4; and a thin chalky white tuffaceous layer at 379.35	Siltstone, like 61) Oil shale, like 62) contains analcitic, marcøsite lined nodules at 363.4, 363.6 and 364.5	LITHOLOGIC DESCRIPTION Oil shale, like 62) Fractures lined with marcasite xtals as in 63	TG2-3 PAGE 10 PAGE 10 FOTAL DEPTH REMARKS:
barren		mod (20GT)	6.2 av	15. 32 Casa	barren)	lean (12GT)	H [PF]

GPO 846 - 153	-				
					:
		xtals 470.5-470.55			4
	mod	3 Oil shale, top l-ft contains several thin siltstone layers; layer of analcite	473.5	470.5	77
104		several other fracture surfaces also coated with marcasite aggregates			
	barren	27.5 Siltstone as in 74) fracture surface at 458-459 coated with marcasite aggregates	70.5	43	76
				•	
40GT /	Rich	1.3 Oil shale, dusky yellowish brown, varved, V. fine grain marcasite common	43	41.7	75
		resinous substance			
,		biotite? and dark organic flakes; fracture surface at 434-435 coats	シンタスの	Heren	f
barren	ba:	8 Siltstone, pale brown, sandy, slightly calcareous, contains chalky analcite,	41.7	33.7	74
18 GT					-
.1.	429-(]		,		
429 = 46 GT	428-429	(R)			
	(#23.0 (E) 18GT	surfaces lined with marcasite octagons			
	(421.9 15GT)	gypsum? layer and nodules at 419.2-419.3, 423.3 and at 424.9-425. Fractured		·	• • •
	36 33GT) X)	siltstone at 411.9-412.2, 411.3-411.9, 419.87-419.96, 420.4-420.9, analcite and			,
**	15-2	30.23 Oil shale dk to dusky yellowish brown, contains tuffaceous sandstone and situstome	433.7	403.47	73
	3.5	and marcasite at top			9
arren-lean "	S	1.9 Siltstone like 61) contains thin layer of oil just below a thin layer of analcite	403.47	401.57	72
		THICK- LITHOLOGIC DESCRIPTION	70	FROM	·•
		REMARKS:	CASING	CAS	
		DATE COMPLETED DRILLER LOGGED BY	DATE BEGUN	DAT	
	<u> </u>	ELEVATION	LOCATION		
	다 일 	TG2-3 PAGE 11	ח ביים ביים ביים ביים	ם ם	

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CORE LOG

U. S. GEOLOGICAL SURVEY

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	middle	B.	·		
barren - lean	Siltstone, like 84) probably tuffaceous, contains 1/2" oil shale parting near	0,6 Si	520.4	519.8	98
	j.w.				
25 GT - mod	il shale, dusky brown, varved, like 75)	5,4 0il	19.8	14.4	85
•					
	grained marcasite		Non-Ma	Herwarm	
barren - lean	Siltstone, light olive gray, contains very thin zones of oil shale and very fine	7.4 S	14.4	07 .	84
25 GT mod	il shale like 75)	4.4 Oil	07	502.6	83
			,		
barren - lean	Siltstone like 74)	3 S	502.6	99.6	82
	lithology exceeding 1/2 ft layers	<u></u> 1			
barren - lean	il shale and siltstone about half and half like beth 74) and 75) neither	6.6 Oil	99.6	93	81
	thicker layers of fair-grade oil shale in 484-486 and 488-489 intervals	t)			
barren - lean	Siltstone, like 74) contains a few thin layers lean-grade oil shale and a few	14.4 S	93 .	78.6	80
15-20 GT	Oil shale, like 75)	1.7	_	76.9	79
		5	474-47	Heres M	
barren - lean	Siltstone, like 74)	3.4 S	476.9	473.5	78
	LITHOLOGIC DESCRIPTION	THICK- NESS	ТО	FROM	~
	REMARKS:		CASING	, CA	
	GGED BY		DATE BEGUN	DA	
7H	PAGE 12 TOTAL DEP	TG2-3	DRILL HOLE.	ר ס	

Drill hole

GPO 846 - 1		 -			
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					٠.
		\dashv	- 1		•
Carter	Analcite and gypsum intergrowths in what appears to have been a leached zone	5 0.3	565.	565.2	٠
7 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5					
	565-565.2 coated with blue-white analcite				
	distance at 20000 need	4.5	65.2	60.7	92
rich (39-41 G					
	and marcasite intergrowths at 558./5 - 550.05	-		-	
(12-25 GT)	110 75 BEO DE	8.13	60.7	52.27	91
fair - mod	. 1 1:1, 07) contains	i			
	C. R. C.	7 2.79	52.27	49.48	90
rich (40 GT)			ì		
	549,05				
	- 1				
	nssiltstone layer at				
(13-7161)				- 1	
110 01(T)	partings at 538.2, 539.1	3.23	49.48	46.25	89
ה ה ה ה ה ה ה ה ה ה ה ה ה ה ה ה ה ה ה					
	Tuffaceous siltstone	5 .15	46.25	46.1	38
barren					
	of 40 GT grade				
	Interval contains limestone. 15-25 GT except 530.7- 532.25 which appears to be				
	05, 523.3, 523.83, 530.32, 531.13, 531.22, 535.				4
rair - mou	ish brown, contains very thin analcitic siltstone	25.7	546.1	520.4	57
· [THICK-	10	FROM	
			CASING	CAS	
	DATE COMPLETED DRILLER		DATE BEGUN	DAT	
	ELEVATION		LOCATION _	1.00	
	TOTAL DEPT		DRILL HOLE	DRI	
OF.	PAGE 13		Ì	*	
	CORE LOG)		
		1			

LOCATION	ELEVATI
DATE BEGUN DATE COMPLETED.	
CASING	REMARKS:
TO THICK-	LITHOLOGIC DESCRIPTION
Oil shale, dark	yellowish brown to dusky brown, very thin analcitic zoneSat
568.16, 568.33, 568	.6, 568.82, 569.3, 569.65, vuggy analcite nodule at 574.9;
5-566.8: 18	6.8-567.65: 24 GT; 567.6
: 40	573.95~577: 28 GT
83 6 Oil shale, dark yel	yellowish brown, analcite layer at 577.15, 577.45, and 582.95;
very thin	and disseminated pyrite throughout
84.5 1.5 Oil shale, like 92)	
86.1 1.5 Oil shale, like 95)	
86.3 0.2 Analcite, vuggy	
87.1 0.7 Oil shale, like 95)	
1 87.2 0.1 Analcite, like 98)	
убаніўсь:	
2 91.6 4.4 Oil shale, like 97)	
6 593.6 2.0 Oil shale, like 97)	

			-3	TG2-3	2
		LOCATION		ELEVATION TOTAL D	# \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
	DAT CAS	DATE BEGUN		GGED BY	
	FROM	10	THICK-	LITHOLOGIC DESCRIPTION	
<u>သ</u>	593.6	595	1.4	Oil shale, like 97)	mod (22 GT)
2	95	97.42	2.42	Oil shale, like 97)	mod (26 GT)
<u>,,, , , , , , , , , , , , , , , , , , </u>	97_42	97.54	0.12	Tuffaceous siltstone, analcitic	barren
4				1	
8_	97.54	98.36	1.82	Oil shale, yellowish brown, thin tuffaceous siltstone layer at 598.22	fair (20 GT)
74					
07	98.36	98.7	0.34	aceous, ar	barren
4	ŀ	- 1			
8	98.7	604.25	5.55	Oil shale, pale yellowish brown, tuffaceous analcitic siltstone layers at 599.95,	fair (16 GT)
4	.	`			
, ,					
- 6	04.25	05	0.75	Oil shale, dusky brown	rich (43 GT)
<u> </u>	05	90	_4	Oil shale dusky vellowish brown	mod. (23GT)
	90	10	4	Oil shale, dusky brown; thin tuff. layers at 607.85, 607.92, 608.06, 608.25	rich (37GT)
				thin toff	
12	10	12	2	~	fair
				^	
13	612	613)—1	Oil shale, pale yellowish brown, very silty, almost a siltstone, calcareous	lean
· ·			,		
					GPO 846 - 153

Drill hole

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631.92 633.75 1.83 Oil shale,	123	122	121	120	119	118	1117	116		115	114	* 7.	
75 1.83 011	26.35	24.5	23.6	21.8	21.05	21	18.86	17		13.4	613	FROM	ָ כַּסְּרָ שֵּ
.83 Oil	31.92	26.35	24.5	23.6	21.8	21.05	21	18.86		617	613.4	70	DRILL HOLE LOCATION DATE BEGUN CASING
1 1	5.57	1.85	0.9	1.8	0.75	0.05	2.14	1.86		3.6	0.4	THICK-	Z 11G2-3
like 120), analcite parting at 632.83	Oil shale, like 117) analcite parting at 627, 627.6, 628 and 631.7; nearly all joint surfaces lined with analcite	Oil shale, like 120) analcite parting at 624.65	About equal parts analcitic partings and oil shale in	Oil shale, analcite at 623.45	0il shale, analcite at 621.65	Analcite parting	4 0il shale, analcite parting at 620.14	6 Oil shale	5 615.3, 615.4 and 616.35	Oil shale, dusky yellowish brown, analcitic siltstone	Tuffaceous siltstone, bentonitic?	K- LITHOLOGIC DESCRIPTION	DATE COMPLETED DRILLER
	628.3, 629.08, 630, 630.22		beds up to 0.2 ft thick							e partings at 615.15, 615.2-			ELEVATIONTOTAL DEPTH,
mod (20 GT)	fair (14 GT)	mod (23 GT)	barren - lean	mod (25 GT)	lean (8 GT)	barren	fair (19 GT)	mod (22 GT)		- rich (43 CT)	barren		16 OF

	ר ס	DRILL HOLE	TG2-3A	3A ELEVATION
	DATE	TE BEGUN.		DATE COMPLETED DRILLER LOGGED BY
	CA	CASING		REWARKS:
	FROM	TO	THICK-	LITHOLOGIC DESCRIPTION
•	633.75	636	2.25	Core loss
	36	40	4	Not cored. TG2-3A core begins at 640
25	40	46.5	6.5	Oil shale, dusky brown to grayish brown, obscurely finely
				contains lenses of darker material, bedding planes show
				contains nodular analcite at 642.1, 643.6 and in vuggy
				latter also lined with marcasite and some calcite; joint
				res at 643.5 - 643.9 lined with finely xtln c
				at 645.3
26	46.5	50.7	4.2	Oil shale, dark yellowish to grayish brown, conspicuously
				very th
27	50.7	52.4	1.7	Oil shale, dusky yellowish brown, varved; vuggy at 651.
82	52:4	64.8	12.5	Oil shale, grayish brown to dusky brown, vuggy leached
				stellate clusters of blade-like aggregate partly leached,
	-			marcasite, analcite and calcite at 654-656; irregular
				659-663.8; occasional fractures at 60° to the bedding
				analcite(?).
<u> </u>	64.8	69	4.2	Oil shale, gravish brown to dusky brown same as 128);
		-		667-668 whose sides are coated with marcasite, calcite
ŏ	- 69	70.2	1.2	ve loss
<u> </u>	670.2	684.2	14	Oil shale, grayish brown, obscurely banded, contains stellate
				are calcite filled

GPO 946-153

CONTRO

DRILLER. DATE COMPLETED. DATE COMPLETED. DATE COMPLETED. DATE COMPLETED. PREMARKS. LITHOLOGIC DESCRIPTION SELLER. LOGGED BY LITHOLOGIC DESCRIPTION SELLER and marcasite. G84.2 691.9 7.7 Oil shale like 131) but banding more distinct; contains very thin darker bleb of analcite, calcite and marcasite. 91.9 97.8 5.9 Oil shale, distinctly banding finding indistinct, micro-lenticles of coaly matter at 692.2-692.3; vuggy zone 695.1-695.2 97.8 703.6 5.8 Oil shale, distinctly banded gray and grayish brown, bedding disturbed at 697.8-700, contains analcite blebs at 703.2-703.3 97.8 703.6 5.8 Oil shale, distinctly banded gray and grayish brown; irregularly shaped lens of marcasite, calcite and analcite intergrowths at 715.9-716.1; disturbed bedding at 723.6-724.2 and 725.5-726; analcite nodules at 725 and 726.5 and 726.5 analcite nodules at 725 and 726.2 at 730.2-2 at 730.3-3 29 25.4 Oil shale, banded mod yellowish brown (sight) and dusky brown (dark); stellate vuggy zone lined with marcasite, analcite nodules at 725.3-726.1 at 730.5-1 banding is conspicuous; contains two layers of microsite 1/4-1/2 in thick at 731.2 and 731.3 and two layers of tuff 1/8-1/2 in. thick at 731.05 and 731.2 32.8 39 6.2 Oil shale, grayish brown core broken because of leached vuggy zones to 735; r of interval pale to mod yellowish brown, bedding very thin but indistinct for 1/4-77 8.7 Oore lost Where light and dark banding is conspicuous; Tail 2.8 Sandstone, pale yellowish brown, tuffeceous, analcitic (MANDGAME-MAKKERT) Tail 2.8 Sandstone, pale yellowish brown, tuffeceous, analcitic (MANDGAME-MAKKERT)						
DRILLER_LOGGED BY_LOGATION						
DRILLER LIGATION DATE COMPLETED DRILLER LITHOLOGIC DESCRIPTION LITHOLOGIC DESCRIPTION FROM TO THICK LITHOLOGIC DESCRIPTION LITHOLOGIC DESCRIPTI				- constant to make.		
DRILLIPRI. LOCATION DATE COMPLETED DRILLER LITHOLOGIC DESCRIPTION FROM TO THICK CASING CASING CASING CASING LITHOLOGIC DESCRIPTION LITHOLOGIC DESCRIPTION LITHOLOGIC DESCRIPTION LITHOLOGIC DESCRIPTION LITHOLOGIC DESCRIPTION FROM TO THICK LITHOLOGIC DESCRIPTION LIT	ļ			27.00 27.00 27.00 28.00	Ų,	,
DRILL HOLE LOCATION DATE COMPLETED DATE SEGUN DATE COMPLETED DATE SEGUN DATE COMPLETED DATE SEGUN DATE COMPLETED DATE SEGUN TO THICK- CASING FROM TO THICK- CASING FROM TO THICK- CASING FROM TO THICK- OIL shale like 131) but banding more distinct; contains very thin darken distinct di			5.42	(*) (*) (*) (*)	7	·
DRILL HOLE LOCATION DATE COMPLETED DATE ASING FROM TO NESS Oil shale like 131) but banding more distinct; contains very thin darket of nearly and party and prayish brown, banding indistinct, micro-lenticles of matter at 692.2-692.3; vuggy zone 695.1-695.2 97.8 5.9 Oil shale, dot to grayish brown, banding indistinct, micro-lenticles of matter at 692.2-692.3; vuggy zone 695.1-695.2 97.8 703.6 5.8 Oil shale, dark yellowish to dusky yellowish brown; irregularly shaped in the party and grayish brown, banding disturbed in the party and grayish brown; irregularly shaped in the party and grayish brown (light) and dusky brown (dark); starty and party and grayish brown (light) and dusky brown (dark); starty and grayish brown core broken because of leached vuggy zone lined with marcasite, analcite and calcite at 729-729.2; at it is a starty and grayish brown core broken because of leached vuggy zones to jugge to make the party thin but indisting and two layers of tuff 1/8-1/2 in. thick at 731.05 and 731.2 32.8 39 6.2 Oil shale, grayish brown core broken because of leached vuggy zones to jugge to make the party thin but indisting and two layers; broken into plates 1 in. to dusky brown, bedding indistinct except in to dusky brown.	ļ	pale yellowish brown, tuffaceous, analcitic	1.	754	51.	139
DRILL HOLE LOGATION		light and dark banding is conspicuous				
DRILL HOLE LOCATION DATE EGUN DATE COMPLETED REMARKS: LITHOLOGIC DESCRIPTION FROM TO NESS CASING Of analcite, calcite and marcasite 91.9 97.8 703.6 29 25.4 Oil shale, distinctly banded gray and grayish brown, bedding disturbed in marcasite, calcite and analcite intergrowths at 715.9-716.1; disturbed in marcasite, calcite and analcite intergrowths at 715.9-716.1; disturbed in marcasite, analcite, banded mod yellowish brown (light) and dusky brown (dark) sturbed in marcasite, analcite, banded mod yellowish brown (light) and dusky brown (dark); st vuggy zone lined with marcasite, analcite and calcite at 729-729.2; at 731-731.3 and two layers of tuff 1/8-1/2 in. thick at 731.05 and 731.2 32.8 39 6.2 Oil shale, grayish brown core broken because of leached vuggy zones to 7 of interval pale to mod yellowish brown, bedding very thin but indisting to the layers; broken into plates 1 in. the core is the layers of tuff 1/8-1/2 in. thing the lack of contrasting more organic rich layers; broken into plates 1 in. the core is the layers of the layers of the plates 1 in. the core is the layers of leached vuggy zones to 7 ore lost		l shale, grayish brown to dusky brown, bedding indistinct except in top l f	•	•		138
DRILL HOLE 1027-98 LOCATION DATE COMPLETED DRILLER LOGGED BY CASING REMARKS: FROM TO NESS LITHOLOGIC DESCRIPTION FROM TO NESS LITHOLOGIC DESCRIPTION LOGGED BY LOGGED		los	1.	•	39	·
DRILL HOLE LOCATION ELEVATION ELEVATION BATE COMPLETED DRILLER LOGGED BY LOG		of contrasting more organic rich layers; broken into plates 1 in. thick				
DRILLHOLE 162-38 LOCATION		interval pale to mod yellowish brown, bedding very thin but indistinct				-
DRILL HOLE LOCATION		shale, grayish brown core broken because of leached vuggy zones to 735;	١٠	39	١٠	137
DRILL HOLE 162-36 LOCATION DATE COMPLETED DRILLER LOGGED BY LOCATION REMARKS: CASING REMARKS: FROM TO THICK Off analcite, calcite and marcasite 91.9 97.8 5.9 Oil shale, mod to grayish brown, banding indistinct, micro-lenticles of matter at 692.2-692.3; vuggy zone 695.1-695.2 97.8 703.6 5.8 Oil shale, distinctly banded gray and grayish brown, bedding disturbed at 697.8-700, contains analcite blebs at 703.2-703.3 703.6 29 25.4 Oil shale, dark yellowish to dusky yellowish brown; irregularly shaped in marcasite. calcite and analcite intergrowths at 715.9-716.1; disturbed at 723.6-724.2 and 725.5-726; analcite nodules at 726 and 726.5 29 32.8 3.8 Oil shale, banded mod yellowish brown (light) and dusky brown (dark); st vuggy zone lined with marcasite, analcite and calcite at 729-729.2; at 7 banding is conspicuous; contains two layers of marcasite 1/4-1/2 in. thi	ļ	.3 and two layers of tuff $1/8-1/2$ in. thick at 731.05 and 731.				
DRILLER		is conspicuous; contains two layers of marcasite 1/4-1/2 in. thick				
DRILLER	 -	zone lined with marcasite, analcite and calcite at 729-729.2; at				
DRILL HOLE 192-36 LOCATION DATE SEGUN DATE COMPLETED DRILLER LOGGED BY CASING LITHOLOGIC DESCRIPTION FROM TO NESS LITHOLOGIC DESCRIPTION 684.2 691.9 7.7 Oil shale like 131) but banding more distinct; contains very thin darket of matter at 692.2-692.3; vuggy zone 695.1-695.2 97.8 5.9 Oil shale, mod to grayish brown, banding indistinct, micro-lenticles of matter at 692.2-692.3; vuggy zone 695.1-695.2 97.8 703.6 5.8 Oil shale, distinctly banded gray and grayish brown, bedding disturbed a 697.8-700, contains analcite blebs at 703.2-703.3 703.6 29 25.4 Oil shale, dark yellowish to dusky yellowish brown; irregularly shaped in marcasite, calcite and analcite intergrowths at 715.9-716.1; disturbed at 723.6-724.2 and 725.5-726; analcite nodules at 726 and 726.5	 	shale, banded mod yellowish brown (light) and dusky brown (dark);	1.	12	29	136
DRILL HOLE 192-36 LOCATION	 	723.6-724.2 and 725.5-726; analcite nodules at 726 and				
DRILL HOLE 162-36 LOCATION	·	, calcite and analcite intergrowths at 715.9-716.1; disturbed	-			~~~~
DRILL HOLE 162-38 LOCATION	ļ	Oil shale, dark yellowish to dusky yellowish brown; irregularly shaped lens	5	29	I٠	135
DRILL HOLE 162-36 LOCATION	. 	.8-700, contains analcite blebs at 703.2-703.				·T
DRILL HOLE 162-36 LOCATION ELEVATION DATE COMPLETED DRILLER LOGGED BY CASING REMARKS: TO THICK- NESS 684.2 691.9 7.7 Oil shale like 131) but banding more distinct; contains very thin darker 91.9 97.8 5.9 Oil shale, mod to grayish brown, banding indistinct, micro-lenticles of matter at 692.2-692.3; vuggy zone 695.1-695.2		shale, distinctly banded gray and grayish brown, bedding disturbed	1.	03.	97.	134
DATE BEGUN DATE COMPLETED DRILLER LOGGED BY CASING TO THICK- ELEVATION LOGGED BY LOCATION LITHOLOGIC DESCRIPTION 684.2 691.9 7.7 Oil shale like 131) but banding more distinct; contains very thin darker of analcite, calcite and marcasite 91.9 97.8 5.9 Oil shale, mod to grayish brown, banding indistinct, micro-lenticles of	-	at 692.2-692.3; vuggy zone 695.1-695.				
DRILL HOLE 162-36 LOCATION ELEVATION ELEVATION LOGGED BY LOCATION DATE COMPLETED DRILLER LOGGED BY LITHOLOGIC DESCRIPTION FROM TO NESS LITHOLOGIC DESCRIPTION 684.2 691.9 7.7 Oil shale like 131) but banding more distinct; contains very thin darker of analcite, calcite and marcasite	- <u>ļ</u>	shale, mod to grayish brown, banding indistinct, micro-lenticles of		1.	}t	133 23
DRILL HOLE 162-38 LOCATION ELEVATION ELEVATION ELEVATION LOGGED BY LOCATION DATE COMPLETED PRILLER LOGGED BY LOCATION CASING TO THICK- LITHOLOGIC DESCRIPTION MESS LITHOLOGIC DESCRIPTION 684.2 691.9 7.7 Oil shale like 131) but banding more distinct; contains very thin darker	-	f analcite, calcite and				,
DRILL HOLE 162-38 LOCATION DATE COMPLETED DRILLER LOGGED BY CASING PATE COMPLETED REMARKS:, CASING THICK REMARKS:, LITHOLOGIC DESCRIPTION	 -	I shale like 131) but banding more distinct; contains very thin darker	1.	691.9	684.2	132
HOLE TG2-38 FION ELEVATION ELEVATION ELEVATION FEGUN PRILLER PRILLER FEMARKS:		LITHOLOGIC D	THICK- NESS	10	FROM	,
HOLE TG2-38 ELEVATION ELEVATION LOGGED BY LOGGED BY LOGGED BY		REMARKS:		SING	δ	
IG2-38	1	COMPLETED DRILLER			D,	
IGZ-30 PAGE	Гd			CATION _		
		TG2-3A PAGE 18		SILL HOLE	Dí	-

Ţ	044	- T	147 4	44	<u> </u>	146 8	·	T	145	144	143	1	142			· 	141			:	140 7	· 1				
	400		46.1	4.5		841	-		99	92.7	87		82.1				68.4				754	FROM	CÁS	DATE	- t	ت ن ا
	000	л	54	46.1		44.5			841	99	92.7		87				82.1				768.4	10	ASING	E BEGUN	TOCATION	70= 100 m
	-	-1	7.9	1.6		13			42	6.3	5.7		4.9				13.7				14.4	THICK- NESS				10. TO
	dac to reacuting,	lower 3 ft	Same as 146, tuffaceous analcitic rounded blebs 1/4" thick or less are common	Core loss	te at 843.2	Oil shale, dusky yellowish brown, bedding indistinct, irregular aggregate and	lined with bluish white analcite-calcite	darkest and most disturbed part interval is at 832.6 - 835.5; fractures are	Oil shale, dusky brown, bedding indistinct, leached zones at 832.5 and 838.5,	Oil shale, like 142), especially conspicuously banded at 794.3 - 797	Oil shale, like 141)	banded at 782.7-783.8; tuff beds 1/4-1/2 in thick at 782.4	Oil shale, (more distinctly banded than 141) - darkest and most conspicuously	tuff beds	780.7 1/4-1/2" thick; marcasite nodule at 779.2; all slightly calcareous except	tuffaceous nodules at 769.75, tuffaceous sandstone at 778-778.7, and 780.4 and	Oil shale, dark yellowish to grayish brown, bedding somewhat indistinct;	p of interval; (darkest brown zone from 763	765.75 and many thin ones in a zone: 767.8-768.4; marcasite nodules at 764 and	nodules scattered throughout, thin tuff beds at 757,757.7, 758, 763.85, 764.05,	Oil shale distinctly banded although locally irregularly bedded, contains analcite	LITHOLOGIC DESCRIPTION	REMARKS:	GED 8Y	FI EVATION TOTAL	TG2-3A PAGE 19
																·	-)

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CORE LOG

U. S. GEOLOGICAL SURVEY

DRILLING 1642-3M 1604101 1642-3M 1604101 16041						
DRILL HOLE	,					
DRILL HOLE						
DRILLHOLE 162-3A		tuffaceous layer at 912-912.	773			
DRILL HOLE		shale, same as 157, core broken at 910.2-910.6, 912.1-912.8, 913.1-913.	4	6		158
DRILLHOLE 142-3A		4	.5	1.] •	
DRILLHOLE 105-28		, 907-907.8, 908.3-908.7; tuff beds at 906.4-907 and	_			
DRILLERCE DATE COMPLETED DRILLER LOGGED BY		core broken, probably because of leaching at 899.5-900.3, 902903.				
DRILL HOLE 1923A PAGE 20MPLETED DRILLER COMPLETED DRILLER LOGGED BY LOGGED B		shale, grayish brown bedding inconspicuous, fracture filled	ļ		Un	157
DRILL HOLE 162-3A		tuff interbedded with yellowish brown oil	ļ	١٠	1	156
DRILL HOLE			2	١•	f•	
DRILL HOLE 192-3A		shale, yellowish brown, mostly	-	1-4	١.	155
DRILL HOLE 192-3A PAGE 20		and conspicuously banded at 882.7-883.7; a 1/4" thick tuff at 882.				
DRILL HOLE 162-3A PAGE 20 LOCATION DATE BEGUN DATE COMPLETED DRILLER LOGGED BY LOGGED BY CASING LOTAL DEPTH LOGGED BY LOGGED BY REMARKS: LITHOLOGIC DESCRIPTION 855 856 1 Core loss 57.3 1.3 like 148) brecciated oil shale 57.3 58.3 1 Core loss (not recorded in TOSCO assay report) 58.3 65.8 7.5 0il shale, mod to gravish to dusky velicated and brown, brecciated zones at 860-860.5 58.3 65.5 0.7 Core loss (not recorded in TOSCO assay report) 65.8 66.5 0.7 Core loss (not recorded in TOSCO assay report) 70 70.6 0.6 Core loss (not recorded, TOSCO) 70 70.6 0.6 Core loss (not recorded, TOSCO) 70 70.6 0.6 Core loss (not recorded, TOSCO) Xtals; analcite layers at 873.4-873.6		shale, like 150) vuggy zones at 876.2-876.3, 880.6-881, 885-885.1, 885.	1:2-	1.	74	154
DRILLER		analcite layers at 873.4-873.				
DRILL HOLE		shale as in 150) fractures lined and partly filled with analcite and	-4	74	70.	153
DRILL HOLE 162-3A LOCATION		loss (not recorded,	6	١.	70	
DRILL HOLE 1927-3A LOCATION		shale as in 150) brecciated zone 869.1 -	ů,	70	66.	152
DRILL HOLE 162-3A LOCATION ELEVATION ELEVATION TO TAL DEPTH DATE BEGUN DATE COMPLETED DRILLER LOGGED BY CASING THICK REMARKS: REMARKS: LITHOLOGIC DESCRIPTION 855 856 1 Core loss 56 57.3 1.3 like 148) brecciated oil shale 57.3 58.3 1 Core loss (not recorded in TOSCO assay report) 58.3 65.8 7.5 Oil shale, mod to grayish to dusky yellowish brown, brecciated zones at 860-860.5 and 862.2-862.7; fractures filled with calcite-analcite		loss (not recorded in TOSCO assay	.7	i.	65.	1 51
DRILL HOLE 162-3A LOCATION		862.2-862.7; fractures filled with calcite-analcite				
DRILL HOLE 162-3A LOCATION ELEVATION ELEVATION ELEVATION TOTAL DEPTH DATE BEGUN DATE COMPLETED DRILLER LOGGED BY CASING LITHOLOGIC DESCRIPTION 855 856 1 Core loss 57.3 1.3 like 148) brecciated oil shale 57.3 58.3 1 Core loss (not recorded in TOSCO assay report)		shale, mod to grayish to dusky yellowish brown, brecciated zones at	5		•	150
DRILL HOLE 162-3A LOCATION		loss (not recorded in TOSCO assay	ļ	•		
DRILL HOLE 192-3A PAGE 20 LOCATION ELEVATION ELEVATION TOTAL DEPTH DATE BEGUN DATE COMPLETED PRILLER LOGGED BY TOTAL DEPTH CASING REMARKS: LITHOLOGIC DESCRIPTION 856 1 Core loss		148) brecciated oil	·ω	1-	Т	[49
OCATION DATE COMPLETED DRILLER LOGGED BY TOTAL DEPTH LOGGED BY REMARKS: LOGGED BY LOGGED BY REMARKS: LOGGED BY LOGGED BY LOGGED BY LOGGED BY REMARKS: LOGGED BY REMARKS: LOGGED BY LOGGED BY REMARKS: LOGGED BY REMARKS: LOGGED BY LOGGED BY REMARKS: REMARKS: LOGGED BY REMARKS: LOGGED BY REMARKS: LOGGED BY REMARKS: REMARKS: LOGGED BY REMARKS: R		los		856	855	
PAGE 20 E 192-3A ELEVATION TOTAL DEPTH UN DATE COMPLETED PRILLER LOGGED BY LOGGED BY LOGGED BY LOGGED BY LOGGED BY REMARKS: LOGGED BY REMARKS: LOGGED BY LOGGED BY REMARKS: LOGGED BY REMARKS: LOGGED BY LOGGED BY REMARKS: REMARKS: LOGGED BY REMARKS:		DESCRIPTIO	THICK- NESS	10	FROM	
E 162-3A PAGE 20 PAGE 20 TOTAL DEPTH		COMPLETED DRILLERREMARKS:		ASING	ი _წ	•
IGZ-3A PAGE ZU				OCATION		
	OF		TG2-	RILL HOLE	۵	

D.

COM

NHICK NESS LITHOLOGIC DESCRIPTION 2.0.8 Core loss 3.1 Oil shale, dark yellowish brown, mod well banded, vugs are small and leg 20.8 Core loss 4.4 Oil shale, mod brown, core broken into irr chunks at top and bottom, mid v thin bedded, flat bedded and broken into plates 1/8-1" thick 4.4 Oil shale, mod brown, core broken into plates 1/8-1" thick 4.5 Oil shale, dark yellowish brown, banded dusky brown, distinct but wavy be white tuff at 945-945.1 1.1 Oil shale, dark yellowish brown, thin and flat bedded, vuggy at 947.8-94. 4.3 Oil shale, dark yellowish brown, thin flat bedded plates at 954.8-953, a fregularly broken at 948.5 - 950.5 2.4 Core loss 4.9 Oil shale, like 164) broken into thin flat bedded plates at 954.8-954.8; irregularly lenticular nodules of mercasite and analcite at 954.8-955; a of gilsonite, black with concoldal fracture, vitreous luster at 958. 5. Oil shale, dark yellowish brown, core vuggy and broken at 960.1-962, core obscurely bedded 962-965, bedding is irregular but moderately distinct a white and brown nodule and layer of analcite-calcite at 95.6 and 96.9 2.0 Dil shale, dusky yellowish brown; bedding obscure and irregular; vuggy bedding disturbed at 970.8-971.2	DATE SECUN. DATE COMPLETED. REMARKS. 1060ED BY. REMARKS. 913.6 916.2 2.6 011 shale, dark yellowish brown, mod well banded, vugs are small and life 2 37 20.8 Core loss 16.2 37 20.8 Linticular and indistinct 40.1 44.5 4.4 011 shale, mod brown, core broken into plates 1/8-1" thick 47 thin bedded, flat bedded and brown, banded dusky brown, distinct but way white tuff at 945-945.1 45.9 47 1.1 011 shale, dark yellowish brown, thin and flat bedded, vugsy at 947.8 Core irregularly broken at 948.5 - 950.5 51.3 53.7 2.4 Core irregularly broken at 948.5 - 950.5 51.3 53.7 2.4 Core irregularly broken at 948.5 - 950.5 51.3 53.7 2.4 Core ishale, black with concoidal fracture, vitreous luster at 954.6-954 irregularly lenticular nodules of marcasite and analcite at 954.8-955 of gilsonite, black with concoidal fracture, vitreous luster at 958.5-950 obscurely bedded 962-965, bedding is irregular but moderately distinct white and brown nodule and layer of analcite-calcite at 955.6 and 965.970; bedding disturbed at 970.8-971.2							
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DATE BEGUN DATE COMPLETED DRILLER LOGGED BY CASING REMARKS; FROM TO THICK LITHOLOGIC DESCRIPTION 913.6 916.2 2.6 0il shale, dark yellowish brown, mod well banded, vugs are small and le log. 37 20.8 Core loss 37 40.1 3.1 0il shale, dark yellowish brown, vuggy zones at 937-937.3 and 939.9-940 lenticular and indistinct 40.1 44.5 4.4 0il shale, mod brown, core broken into irr chunks at top and bottom, mid value of the plates 1/8-1" thick 44.5 45.9 1.5 0il shale, dark yellowish brown, banded dusky brown, distinct but wavy lent tuff at 945-945.1 in white tuff at 945-945.1 45.9 47 1.1 0il shale, broken core as /158	LOCATION	, vuggy at 947.8-947.	dark yellowish brown, thin and flat b	1	ŀ	l*	47.	164
THICK Oil shale, dark yellowish brown, wagy zones at 937-937.3 and 939.9-940 16.2 37 20.8 Core loss 37 40.1 3.1 Oil shale, dark yellowish brown, wagy zones at 937-937.3 and 939.9-940 40.1 44.5 4.4 Oil shale, mod brown, core broken into irr chunks at top and bottom, mid 44.5 45.9 1.5 Oil shale, dark yellowish brown, banded dusky brown, distinct white tuff at 945-945.1	DATE BEGUN DATE COMPLETED REMARKS: CASING REMARKS: PROM TO NESS LITHOLOGIC DESCRIPTION 913.6 916.2 2.6 Oil shale, dark yellowish brown, mod well banded, vugs are small and less at 20.8 Core loss 16.2 37 20.8 Core loss 37 40.1 3.1 Oil shale, dark yellowish brown, vuggy zones at 937-937.3 and 939.9-940 40.1 44.5 4.4 Oil shale, mod brown, core broken into irr chunks at top and bottom, mid to 44.5 4.9 1.5 Oil shale, dark yellowish brown, banded dusky brown, distinct but wavy i white tuff at 945-945.1		broken core as	1	1.	47	45.9	163
DATE BEGUN DATE COMPLETED DRILLER REMARKS: FROM TO THICK LITHOLOGIC DESCRIPTION 913.6 916.2 2.6 Oil shale, dark yellowish brown, mod well banded, vugs are small and le 16.2 37 20.8 Core loss 37 40.1 3.1 Oil shale, dark yellowish brown, vuggy zones at 937-937.3 and 939.9-940 40.1 44.5 4.4 Oil shale, mod brown, core broken into irr chunks at top and bottom, mid 44.5 45.9 1.5 Oil shale, dark yellowish brown, banded dusky brown, distinct but wavy i	LOCATION		at 945-945.1	i				· -
CASING. TO THICK: PROM TO NESS COTE loss 16.2 37 20.8 Core loss 19.1 3.1 011 shale, dark yellowish brown, mod well banded, vugs are small and le lenticular and indistinct 40.1 44.5 4.4 0il shale, mod brown, core broken into irr chunks at top and bottom, mid well banded, flat bedded and broken into plates 1/8-1" thick	DATE BEGUN DATE COMPLETED DRILLER LOGGED BY CASING PROM TO THICK LITHOLOGIC DESCRIPTION PROM TO NESS 16.2 2.6 Oil shale, dark yellowish brown, mod well banded, vugs are small and le le loss 16.2 37 20.8 Core loss 37 40.1 3.1 Oil shale, dark yellowish brown, vuggy zones at 937-937.3 and 939.9-940 16.1 44.5 4.4 Oil shale, mod brown, core broken into irr chunks at top and bottom, mid to the plates 1/8-1" thick	distinct but wavy	dark yellowish brown, banded dusky br	1		Ç1		162
CASING TO THICK LITHOLOGIC DESCRIPTION PROM TO NESS LITHOLOGIC DESCRIPTION 16.2 37 20.8 Core loss 37 40.1 3.1 Oil shale, dark yellowish brown, wuggy zones at 937-937.3 and 939.9-940 16.1 44.5 4.4 Oil shale, mod brown, core broken into irr chunks at top and bottom, mid	LOCATION	1	flat bedded and broken into plates	thin				7
PATE BEGUN DATE COMPLETED DRILLER REMARKS: REMAR	DATE BEGUN DATE COMPLETED DRILLER LOGGED BY LITHOLOGIC DESCRIPTION FROM TO NESS LITHOLOGIC DESCRIPTION 913.6 916.2 2.6 0il shale, dark yellowish brown, mod well banded, vugs are small and led to the standard of the stand	t top and bottom, middle	, mod brown, core broken into irr chunks a	}3	4.4	Į •	1.	161
CASING	DATE BEGUN DATE COMPLETED DRILLER LOGGED BY CASING REMARKS: REMARKS: REMARKS: LITHOLOGIC DESCRIPTION 913.6 916.2 2.6 Oil shale, dark yellowish brown, mod well banded, vugs are small and le 16.2 37 20.8 Core loss 37 40.1 3.1 Oil shale, dark yellowish brown, vuggy zones at 937-937.3 and 939.9-940		and	lenticu				7
CASING	LOCATION	.3 and 939.9-940,	, dark yellowish brown, yuggy zones at	T .		-	37	160
CASING DATE BEGUN DATE COMPLETED DRILLER LOGGED BY CASING TO THICK LITHOLOGIC DESCRIPTION PROM TO NESS LITHOLOGIC DESCRIPTION 913.6 916.2 2.6 011 shale, dark yellowish brown, mod well banded, vugs are small and le	DATE BEGUN DATE COMPLETED DRILLER LOGGED BY CASING TO THICK NESS LITHOLOGIC DESCRIPTION 913.6 916.2 2.6 011 shale, dark yellowish brown, mod well banded, vugs are small and le		3.8	Core	20.8	37		-1
ATE BEGUN DATE COMPLETED DRILLER LOGGED BY ASING REMARKS: TO THICK- LOGGED BY REMARKS:	ATE BEGUN DATE COMPLETED DRILLER LOGGED BY ASING REMARKS: LOGGED BY TO THICK- LITHOLOGIC DESCRIPTION	are small and	, dark yellowish brown, mod well banded,		•		+	159
DATE COMPLETED DRILLERLOGGED BY	DATE COMPLETED DRILLER ELEVATION LOGGED BY REMARKS:		DESCRIPTIO		THICK-	ТО	FROM	· ·
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		<u> </u>			
	Oil shale, like blebby part of 173)	0.6 0	1018.2	1017.6	174
		0.4 C	17.6	17.2	
	blebs at 1015.7-1016.1	Ъ			
	Oil shale, dusky yellowish brown, mod to obscurely bedded, pale grayish brown	2.8 0	17.2	14.4	173
	vugs at 1011.9-1012.1 and at 1013.4-1013.6	V		-	
	Oil shale like above, with alternating zones of obscure and distinct bedding;	3.8 0	14.4	10.6	172
	Core loss	3.5 C	10.6	07.1	•
	from 1003.8-1007.1	-fi			
	Oil shale, dark yellowish brown, mod distinctly bedded, broken into irr chunks	4.4 0	07.1	1002.7	171
	contains a 1" thick tuff at 995.6; contains a vug in basal 0.5 ft	c			
	Oil shale, like 169) but with mod distinct bedding except in bottom 1 ft;	8.7 0	1002.7	94	170
	Core loss	2.3 C	94	91.7	
	984.8-985.1	9			-
	common; a 1/8" layer of analcite at 984.25; "X" shaped marcasite fills at	c		:	
	abundant short thin blebs; aggregates of blade-like cavities 1" to 0.3 ft are	B			
	Oil shale, dusky yellowish brown, obscurely bedded, lighter parts of shale make	10.7 0	91.7	81	169
	vugs at 975.7-976, near 978, and at 980.6-980.8	V			
	vuggy broken core zones at 975.2-975.7 and 978-979.3; small marcasite-filled	∢			
	Oil shale, pale to dk yellowish brown, bedding mod distinct as at 965-967;	9 0	981	972	168
	LITHOLOGIC DESCRIPTION	THICK- NESS	70	FROM	
	スロ番みなった。		CASING	CA	
	DATE COMPLETED DRILLER LOGGED BY		DATE BEGUN	0 A	
H	ELEVATI		LOCATION	ĹO	
OF	-3A PAGE 22	TG2-3A	DRILL HOLE.	DR	
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GPO 845-153

Drill hole

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f				,	
	Core loss	<u>-</u> 1 57	1055	1053.5	
	core broken at 1051-1052 and at 1053-1053.5				
	Oil shale, like 182; contains tuffaceous layers at 1049.35, and 1052.1-1052.4,	4.5	1053.5	49	184
	Oil shale, dark to dusky yellowish brown, blebby as in 173)	2.5	49	46.5	183
	white chalky analcite				
	zone 104.25-1040.6 - 1042.3-1042.4, and at 1045.9 fractures coated with bluish				
	distinctly banded, thin marcasite layers and blebs common; tuffaceous layers in				٠.
	Oil shale, dark yellowish brown except 1036.65-1037.75 which is dusky brown,	11	46.5	35.5	182
	Core loss	l-	35.5	34.5	
	Oil shale, dark yellowish brown, mod well bedded	2.3	34.5	33.2	181
	aggregate			-	2
A A A A A A A A A A A A A A A A A A A	Oil shale, dark yellowish brown, wavy bedded with microvuggy small analcite	2.3	33.2	30.9	180
	Oil shale with 3 tuffaceous beds 0.2 ft, 1/4", one 1/2" at top, middle and botton	0.5	30.9	30	179
	Oil shale, pale yellowish brown, mostly broken core	.8	30	28.6	178
	Core loss		28,6	27.6	
	zones and broken core at 1025.2-1025.4 and basal 0.2 ft				
	Oil shale, dark grayish brown obscurely bedded, except in basal 0.6 ft; vuggy	4	27.6	23.6	177
-	brown oil shale at 1021.5-1022.4				
	Tuff bed with vuggy mones at 1021.5-1021.7 and 1022-6-1023.2; and pale grayish	2.6	23.6	21	176
	Oil shale, dusky yellowish brown, mod distinctly bedded	2.8	2 1021	1018.	175
	LITHOLOGIC DESCRIPTION	THICK- NESS	ТО	FROM	
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	DATE COMPLETED DRILLER LOGGED BY		DATE BEGUN	DA	
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OF	TG2-3A PAGE 23		DRILL HOLE	יט מל	
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				194 1111 1114		1100	99.1 · 1100 · 1111	92.2 99.1 1100 1111	89.2 92.2 99.1 1100 1111	88 89.2 92.2 99.1 1100	83.5 88 89.2 92.2 99.1 1110	78.1 83.5 88 89.2 92.2 92.2 1100	75 78.1 83.5 88 89.2 92.2 92.2 1110	75 78.1 83.5 88 89.2 92.2 99.1	75 78.1 83.5 88 89.2 92.2 92.2 1100	75 78.1 78.1 83.5 88 89.2 92.2 92.2	75 78.1 83.5 88 89.2 92.2 99.1	64 66 75 78.1 83.5 88 89.2 92.2 99.1	59.5 64 66 66 75 78.1 78.1 83.5 88 89.2 92.2 92.2	59.5 64 66 66 75 78.1 83.5 88 89.2 92.2 92.2	75 75 75 78.1 83.5 88 89.2 99.1 1110	FROM 1055 59.5 64 66 66 75 78.1 78.1 83.5 88 89.2 92.2 1110	FROM 1055 64 66 66 75 78.1 83.5 88 89.2 99.1 1110	FROJ 1055 59.5 64 66 66 75 78.1 89.2 92.2 11100	FROJ 1055 59.5 59.5 64 66 66 88 89.2 92.2 1111
			ω			0.9	6.9	ω	1.2	2.5	5.4	3.1			9		2	4.5		. 5 4.5	THICK- NESS	SUN		тс2-3А	
	1113.5-1114	grayish orange tuffaceous blebs and layers at 1111-1112.1, 1112.8-1113.5,	Oil shale, pale yellowish brown to mod brown, bedding mod obscure to obscure,	analcite layers at 1104 and 1106.1	Oil shale, like 187) core vuggy and broken at 1100-1101 and 1103.5-1104.9; thin	Core loss (not reported in Tosco Assay report)	Oil shale, like 187) core vuggy and broken at 1098-1099.1	Oil shale, irr bedded, blebby, like 186	Oil shale like 187) mostly broken, lacks marcasite, analcite and tuff	Core loss	Oil shale like 187) but lacks analcite and tuff layers	Core loss	1070, 1070.8-1072, and 1073.9-1075	tuff are scattered throughout; core vuggy and broken		non	Oil shale, dark yellowish brown, indistinct bedding, small pale grayish brown	Core loss	hydrocarbon at 1055.1-1055.4	Oil shale, mod well banded, like 182; contains zone saturated with dried	LITHOLOGIC DESCRIPTION	DATE COMPLETED	ELEVATION TOTAL DEPT	t.c. 24	"CORE LOG
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CORE LOG

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	BOTTOM OF HOLE			
	lenticular analcite-marcasite aggregate			<u> </u>
	Oil shale, like 195, core broke	0.7 0.9	9.8 1130	1129
	10			·
	nodules and finely disseminated; core broken at 1124.1-1126.5; marcasite occurs			<u> </u>
	Oil shale, tuffaceous and analcitic throughout, analcite occurs in chalky layers,	8 6.3	.5 29.	198 23
	analcite at top and bottom			
	Oil shale, banded like 195) but contains zones of finely disseminated chalky	5 1.2	.3 23.	197 22
	Oil shale, like 195) but brecciated and microfaulted	3 1.8	5 22.	196 20.
	analcite layer at 1118.9 and an irr vug at 1120.1			T.
	cciat			1
	in thin layers, irr aggregates, and minutely disseminated throughout; contains a			
	Oil shale, dark yellowish brown and grayish brown, distinctly banded, marcasite	.5 6.5	1114 1120.	195 11
	LITHOLOGIC DESCRIPTION	O THICK-	FROM TO	
	REMARKS:	GCZ	CASING	
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OF	TG2-3A PAGE 25	OLE	DRILL HOLE	٠
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